under consideration needs but little remark. The descriptions are full and accurate, and the figures are nearly all engraved from drawings beautifully executed by Miss Elizabeth F. Bonsall, and leave but little to be desired. Three, however, of the plates—Nos. 2, 10, and 15—are from the author's own drawings, and are fully equal, if not superior, to the rest. 123 species of spiders of the orb-weaving group are described, and, of these, twenty-four are considered to be new to science. Four new genera are also characterised. In every way, part ii. will be of great use and importance to systematic araneologists. A portrait of Nicolas Marcellus Hentz (justly called the father of American araneology) forms a most appropriate frontispiece. O. P. Cambridge.

THE SEA AND ITS COASTS.

Sea and Land, Features of Coasts and Oceans, with special reference to the Life of Man. By N. S. Shaler, Professor of Geology in Harvard University. Illustrated. (London: Smith, Elder, and Co., 1895.)

IN more than one sense this book is a thinner one than "Aspects of the Earth." Of the seven essays which it contains—in the main republications—the first four deal with familiar subjects—the work of the sea, its beaches, its depths, and icebergs; the last three treat of harbours, and introduce some questions which are less hackneyed and more interesting. Prof. Shaler writes pleasantly, and his sentences flow easily, but it is sometimes possible to read through several paragraphs without much progress in knowledge, or to find a rather large number of well-turned phrases expended in stating what amounts to a truism. But as the preface informs us that the object of the book is "to introduce unprofessional students of nature to certain interesting phenomena of the sea-shore and of the depths of the ocean," it is very possible that babes in science will find well-sweetened pap more digestible than strong meat. We must, however, protest against the liberties which Prof. Shaler takes occasionally with our mother-tongue. He is too fond of "telephonese" or "telegraphese," as it might be called This tongue may be good American, but it is not good English. We do not mean to assert that no improvements could be made in the latter, or to pose as prudes of etymological purity, but we object to the coinage of new words, or, rather, the misuse of old words, where grammatical expressions already exist, longer only by a few more letters or, at most, syllables. Brevity may be the soul of wit, but it is not always an adornment in speech. Is there any real gain (to take a few examples) in such an adjective as "pivotal," such participles as "fiorded," "forested," "peninsulated," "well-harboured" (*i.e.* with many harbours), and such a verb as to "raft off" in the sense of transport or carry off like a raft.

Prof. Shaler is a picturesque writer, and his descriptions usually are clear and vivid; but dangers lurk in the attempt to be graphic when a locality is known only at second-hand. Of this the book before us affords an amusing instance. Speaking of the advance of dunes, he quotes the well-known case of Eccles (Norfolk), saying: "Thus in Britain one of these dunes in the last century invaded the village of Eccles, and buried the dwellings and the parish church, so that even the top of the spire was hidden. After a number of years the summit of the church began to reappear on the leeward [? windward] side of the hill, and in time the remote descendants of the dispossessed people may be restored to their heritage." But the dwellings had practically disappeared before the dunes rolled over them: the church had been a ruin for at least two centuries; of its body only the foundations remained; there was no spire, and apparently never had been one; and the octagonal lantern of the tower was never wholly buried, unless the well-known engraving in "Lyell's Principles of Geology" represents an exceptional condition of the sandhills. So if the descendants of the original villagers do return to their ancestral domiciles, they will find themselves "Lords of the sands, an heritage of waves." Indeed, since Prof. Shaler wrote, even the old tower has tumbled down, destroyed by the waves during a gale last January.

We venture also to think that Prof. Shaler takes rather too much for granted in assuming, without a hint that this has been disputed, that great rock basins have been excavated by glaciers. Moreover, he is hardly correct in saying that fjords are restricted to ice-worn regions, for Cornwall can show more than one very respectable imitation of such an inlet, and on the Dalmatian coast they are not rare; yet we can hardly suppose that even in the coldest part of the Great Ice Age, precipitate glaciers descended from the Montenegrin Highlands to scoop out the Bocche di Cattaro. But perhaps an inlet of the sea only becomes a fjord when it shallows towards its mouth; if so, that should have been clearly stated. Doubtless these basin-like fjords are difficult to explain; but as Prof. Shaler admits the existence of submerged moraines, no excavation need be required. At any rate it would be well, as a preliminary step, to prove that glaciers are agents of excavation to any important extent, for this has been denied by many geologists, who vainly ask to be shown any proofs of such effects in the subaërial part of their course.

But we must not dwell too much on blemishes, which after all are light. Even the four earlier essays, already mentioned, exhibit a certain freshness, for Prof. Shaler, as an American, selects the majority of his examples from the other side of the Atlantic, instead of using those which have become the stock-in-trade of every European geologist. By this means more than one point is brought out more clearly than is usual in English books, because illustrations are difficult to obtain from our own islands, or any readily accessible part of the neighbouring continent. For instance, his remarks on the action of vegetation in a shallow estuary or bay, and particularly on the growth of "mangrove swamps" are valuable. He describes how the large tapering cylindrical seed of the mangrove, floats in a vertical position, settles down and becomes entangled on the bottom by means of the numerous hooklets which arm its lower extremity, then sends a shoot up above the surface of the water, from which come wide-spreading, low-growing branches. From these long runner-like processes are thrown off, which at last curve sharply downwards through the water till they strike root at the bottom, and then support new crowns, each having its own trunks

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and branches. "Thus a single tree may rapidly march away from the original planting-point until its outer verge may be an indefinite distance from its place of origin." This method of growth enables the grove to resist even fairly strong waves, and facilitates the accumulation of organic débris and inorganic sediment.

Again, there are some striking remarks on the accumulation of molluscs, especially bivalves. Prof. A. Agassiz has already called attention to this process on the great Florida plateau, and Prof. Shaler particularly mentions the special importance of the oyster as a rock builder along the whole coast from New York southwards.

> "In its maximum development" he says, "the larger part of the shallow bottom inside the ocean beach is occupied by beds of these shells. So crowded are these forms, that they push their growth above the level of low-tide mark, and in the region where the mangroves abound they cluster on the roots of the trees to such numbers as often to hide them from view. . . . Between Charleston, South Carolina, and Biscayne Bay, Florida, there is an aggregate area of nearly a thousand square miles which, when the shore assumed its present elevation, was occupied by tolerably deep water that has now become filled to near the level of high water, by sediments composed in large part of oyster-shells."

In fine, these three essays contain not a few interesting and suggestive passages. The illustrations often are very good.

THE CHEMISTRY OF COD-LIVER OIL.

Cod-liver Oil and Chemistry. By F. Peckel Möller, Ph.D. (London: Peter Möller, 43 Snow Hill, E.C., and at Christiania, Norway, 1895.)

THIS book is divided into two parts—the title of part i. is "Cod-liver Oil"; the title of part ii. is "The Law of Atomic Linking, diagrammatically illustrated," and the heading of the first chapter of the second part is "Chemistry." There is a separate preface to each part, and, though bound together in one volume, each forms an independent treatise, and is separately paged. One hundred and eleven pages are devoted to "cod-liver oil," and rather more than five hundred to "chemistry."

In the preface to the first part the author gives two reasons for the publication of the work: (1) to deal with all matters connected with cod-liver oil, and especially with those likely to be of interest to members of the medical profession; and (2) to give the results of the investigations lately undertaken by Mr. Heyerdahl, which "throw the first and only true light on that mystery, the real nature of the oil."

The first and second chapters give an interesting account of Norway, which is styled "the land of the midnight sun and cod-liver oil"; its people, past and present; its social customs; the Gothenburg system in every town; its land question; its fisheries, fishermen, and fishing boats, their tackle and bait; its tourist visitors, and its "oldest established visitor," the cod-fish.

The next chapter is on "cod-liver oil,' and the reader is instructed, as pleasantly as in the preceding chapters, in the ancient and modern methods of preparing the oil for use. The older method, it appears, was in use until so late as the year 1853, when a great improvement was effected by the introduction of the steam process of extraction, by which means the pure oil only is obtained from the livers, instead of oil mixed with a great number of decomposition products. This steam process was a great advance. The resulting oil had lost much of its objectionable taste and smell, but it still retained one very bad characteristic—it was still very apt to give rise to nauseous eructations. Unwelcome flavours continued to assert themselves after a dose of such oil, not once only but again and again, till, as the author says, the unhappy recipient was tempted to say, "life is not worth living if it is to be only at the cost of taking cod-liver oil." Hence the host of attempts that have been from time to time made to treat the oil so as to abolish these disagreeable properties. These are dealt with in the chapter called "Pharmaceutical Annotations," and some forty different ways of disguising or improving the oil are described in detail—the ingredients for mixing with the nauseous article including such diverse things as beer, iron-water, peppermint oil, coffee, eucalyptus oil, wood-tar, ammonia, ketchup, celery-seed infusion, vinegar, iodoform, saccharin, acetic ether, &c.; and, besides all these, every conceivable form of emulsion seems to have been tried. It will be welcome news to many that, in Dr. Möller's opinion, all these elaborate preparations are now quite uncalled for, and that Heyerdahl's investigations have at length led to the possibility of an oil being produced more curative than the old oil, and quite free from nauseating powers. These researches are fully described in a separate chapter, and are considered to have revealed the presence in the oil of two hitherto unknown glycerides, which have been named, respectively, *therapin* and *jecoleïn*. They are both exceedingly unstable compounds, and easily become oxidised, and these oxidation products are believed to be the real cause of the too well-known unpleasant after-effects of the drug. As a result of these discoveries an apparatus has now been devised by which cod-liver oil can be produced on a large scale without even the slightest oxidation taking place. Air is excluded from the beginning to the end of the operation, the process being conducted in a current of carbonic acid from the moment the livers enter the apparatus until the oil obtained from them is safe within the bottles.

The chapter giving a synopsis of the chief researches on the oil since 1822 is very complete, and will no doubt prove of great interest to medical men and pharmacists.

The conclusion arrived at as to the therapeutic agent in cod-liver oil is that "it is the oil itself," and that its remarkable power as a nutritive food is the cause of its medicinal efficacy, and not any special active principle contained in it. This opinion is in agreement with that of the late Prof. J. Hughes Bennett, of Edinburgh, who published, in 1841, a pamphlet on cod-liver oil, which had much to do with the general introduction of the oil as a medicine into this country. It is one of the omissions in the present volume that no reference is made to the work of Dr. Bennett in this direction.

The object of the second part of this work, as set forth in the preface, is mainly to bring the facts of organic chemistry, freed from unnecessary difficulties,

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